CLAIMS

1. 1. A method for retaining error-control code protection across block-size
2. discontinuities occurring between incoming information, having incoming data
3. formatted into ingress data blocks and ingress headers, one ingress header
4. associated with each ingress data block and conveying information about the
5. each ingress data block, and outgoing information having the incoming data
6. reformatted into egress data blocks with sizes different from the ingress data
7. blocks and egress headers, one egress header associated with each egress data
8. bock and conveying information about the each egress data block, the method
9. comprising:
10. (a) generating a code check from data in an ingress data block and from an
11. ingress header associated with the ingress data block;
12. (b) generating a code check from the code check generated in step (a) and
13. an egress header associated with an egress data block derived from in the
14. ingress data block; and
15. (c) generating the outgoing information by combining the egress header with
16. the associated egress data block and code check generated in step (b).

1. 2. The method of claim 1 wherein step (b) comprises:
2. (b1) generating a code check from the egress header;
3. (b2) subtracting a portion of the code check generated from the associated
4. ingress header in step (a) from the code check generated in step (b1); and
5. (b3) adding the code check generated in step (a) to the code check generated
6. in step (b2).

1. 3. The method of claim 2 wherein step (b2) comprises adding the inverse of the
2. portion of the code check generated from the ingress header in step (a) to the
3. code check generated in step (b1).

1   4.   The method of claim 1 wherein step (a) further comprises:

2   (a1)   modifying the code check generated from data in the ingress data block

3   and the associated ingress header to compensate for non-data bits added

4   to the ingress data block.

1   5.   The method of claim 4 wherein step (a1) comprises rotating the code check

2   generated from data in the ingress data block and associated ingress header to

3   compensate for non-data bits added to the ingress data block.

1   6.   The method of claim 1 wherein step (a) further comprises:

2   (a2)   modifying the incoming information to compensate for non-data bits added

3   to the ingress data block.

1   7.   The method of claim 1 wherein step (c) comprises concatenating the egress

2   header with the associated egress data block and the code check generated in

3   step (b).

1   8.   The method of claim 1 wherein step (a) comprises generating a one's-

2   complement sum of successive n-bit binary words included in the ingress data

3   block and the associated ingress header.

1   9.   The method of claim 1 wherein step (b) comprises generating a one's-

2   complement sum of successive n-bit binary words included in the egress header.

1   10.   The method of claim 1 wherein step (a) comprises generating a term-by-term

2   modulo-two sum of successive n-bit binary words included in the ingress data

3   block and the associated ingress header.

1   11.   The method of claim 1 wherein step (b) comprises generating a term-by-term

2   modulo-two sum of successive n-bit binary words included in the egress header.

19

1   12. The method of claim 1 wherein step (a) comprises generating the residue of the

2   ingress data block and the associated ingress header modulo a generator

3   polynomial.

1   13. The method of claim 1 wherein step (b) comprises generating the residue of the

2   egress data block modulo a generator polynomial.

1   14. The method of claim 1 wherein the incoming information includes an incoming

2   code check associated with each ingress data block and step (a) further

3   comprises comparing the ingress code check to the incoming code check and

4   generating an error when the ingress code check does not equal the incoming

5   code check.

1   15. Apparatus for retaining error-control code protection across block-size

2   discontinuities occurring between incoming information, having incoming data

3   formatted into ingress data blocks and ingress headers, one ingress header

4   associated with each ingress data block and conveying information about the

5   each ingress data block, and outgoing information having the incoming data

6   reformatted into egress data blocks with sizes different from the ingress data

7   blocks and egress headers, one egress header associated with each egress data

8   bock and conveying information about the each egress data block, the apparatus

9   comprising:

10   an ingress encoder that generates an ingress code check from data in an

11   ingress data block and from an ingress header associated with the ingress data

12   block;

13   an egress encoder that generates a egress code check from an egress

14   header associated with an egress data block derived from in the ingress data

15   block and from the ingress code check; and

16   a multiplexer that generates the outgoing information by combining the

17   egress header with the associated egress data block and the egress code check.

1   16. The apparatus of claim 15 wherein the egress encoder comprises:

2   an outgoing encoder that generates an egress code check from the

3   egress header and from internal contents;

4   a controller that subtracts a portion of the ingress code check generated

5   from the associated ingress header from the outgoing encoder contents and

6   adds the ingress code check to the outgoing encoder contents.

1   17. The apparatus of claim 16 wherein the controller further comprises a mechanism

2   that modifies the ingress code check to compensate for non-data bits added to

3   the ingress data block.

1   18. The apparatus of claim 16 wherein the controller comprises a mechanism that

2   rotates the ingress code check to compensate for non-data bits added to the

3   ingress data block.

1   19. The apparatus of claim 16 wherein the controller adds the inverse of the portion

2   of the code check generated from the ingress header by the ingress encoder to

3   the outgoing encoder contents.

1   20. The apparatus of claim 15 further comprising a mechanism that modifies the

2   incoming information to compensate for non-data bits added to the ingress data

3   block.

1   21. The apparatus of claim 15 wherein the multiplexer comprises a mechanism that

2   concatenates the egress header with then associated egress data block and the

3   egress code check.

1 22. The apparatus of claim 15 wherein the ingress encoder comprises a one's-

2   complement encoder that generates a one's-complement sum of successive n-bit

3   binary words included in the ingress data block and the associated ingress

4   header.

1 23. The apparatus of claim 15 wherein the outgoing encoder comprises a one's-

2   complement encoder that generates a one's-complement sum of successive n-bit

3   binary words included in the egress header.

1 24. The apparatus of claim 15 wherein the ingress encoder comprises a vertical-

2   parity-check encoder that generates a term-by-term modulo-two sum of

3   successive n-bit binary words included in the ingress data block and the

4   associated ingress header.

1 25. The apparatus of claim 15 wherein the outgoing encoder comprises a vertical-

2   parity-check encoder that generates a term-by-term modulo-two sum of

3   successive n-bit binary words included in the egress header.

1 26. The apparatus of claim 15 wherein the ingress encoder comprises a cyclic-

2   residue-code encoder that generates the residue of the ingress data block and

3   the associated ingress header modulo a generator polynomial.

1 27. The apparatus of claim 15 wherein the outgoing encoder comprises a vertical-

2   parity-check encoder that generates the residue of the egress data block modulo

3   a generator polynomial.

1 28. The apparatus of claim 15 wherein the incoming information includes an

2   incoming code check associated with each ingress data block and the apparatus

3   further comprises a comparator for comparing the ingress code check to the

4   incoming code check and generating an error when the ingress code check does

5   not equal the incoming code check.

29. A computer program product for retaining error-control code protection across
block-size discontinuities occurring between incoming information, having
incoming data formatted into ingress data blocks and ingress headers, one
ingress header associated with each ingress data block and conveying
information about the each ingress data block, and outgoing information having
the incoming data reformatted into egress data blocks with sizes different from
the ingress data blocks and egress headers, one egress header associated with
each egress data bock and conveying information about the each egress data
block, the computer program product comprising a computer usable medium
having computer readable program code thereon, including:

    program code that generates an ingress code check from data in an
ingress data block and from an ingress header associated with the ingress data
block;

    program code that generates a egress code check from the ingress code
check and an egress header associated with an egress data block derived from
in the ingress data block; and

    program code that generates the outgoing information by combining the
egress header with the associated egress data block and the egress code check.

30. The computer program product of claim 29 wherein the program code that
generates a egress code check comprises:

    program code that generates an egress code check from the egress
header;

    program code that subtracts a portion of the ingress code check
generated from the associated ingress header from the egress code check; and

    program code that adds the ingress code check to the egress code check.

23

1　31.　The computer program product of claim 30 wherein the program code that
2　　　subtracts a portion of the ingress code check from the egress code check
3　　　comprises program code that adds the inverse of the portion of the ingress code
4　　　check to the egress code check generated.

1　32.　The computer program product of claim 29 wherein the program code that
2　　　generates an ingress code check further comprises program code that modifies
3　　　the ingress code check to compensate for non-data bits added to the ingress
4　　　data block.

1　33.　The computer program product of claim 32 wherein the program code that
2　　　modifies the ingress code check comprises program code that rotates the ingress
3　　　code check to compensate for non-data bits added to the ingress data block.

1　34.　The computer program product of claim 29 wherein the program code that
2　　　computes the ingress code check further comprises program code that modifies
3　　　the incoming information to compensate for non-data bits added to the ingress
4　　　data block.

1　35.　The computer program product of claim 29 wherein the program code that
2　　　generates the outgoing information comprises program code that concatenates
3　　　the egress header with the associated egress data block and the egress code
4　　　check.

1　36.　The computer program product of claim 29 wherein the program code that
2　　　generates the ingress code check comprises program code that generates a
3　　　one's-complement sum of successive n-bit binary words included in the ingress
4　　　data block and the associated ingress header.

1   37.   The computer program product of claim 29 wherein the program code that

2   generates the egress code check comprises program code that generates a

3   one's-complement sum of successive n-bit binary words included in the egress

4   header.

1   38.   The computer program product of claim 29 wherein the program code that

2   generates the ingress code check comprises program code that generates a

3   term-by-term modulo-two sum of successive n-bit binary words included in the

4   ingress data block and the associated ingress header.

1   39.   The computer program product of claim 29 wherein the program code that

2   generates the egress code check comprises program code that generates a

3   term-by-term modulo-two sum of successive n-bit binary words included in the

4   egress header.

1   40.   The computer program product of claim 29 wherein the program code that

2   generates the ingress code check comprises program code that generates the

3   residue of the ingress data block and the associated ingress header modulo a

4   generator polynomial.

1   41.   The computer program product of claim 29 wherein the program code that

2   generates the egress code check comprises program code that generates the

3   residue of the egress data block modulo a generator polynomial.

1   42.   The computer program product of claim 29 wherein the incoming information

2   includes an incoming code check associated with each ingress data block and

3   wherein the program code that generates the ingress code check further

4   comprises program code that compares the ingress code check to the incoming

5   code check and generates an error when the ingress code check does not equal

6   the incoming code check.

1 43. A computer data signal embodied in a carrier wave for retaining error-control

2 code protection across block-size discontinuities occurring between incoming

3 information, having incoming data formatted into ingress data blocks and ingress

4 headers, one ingress header associated with each ingress data block and

5 conveying information about the each ingress data block, and outgoing

6 information having the incoming data reformatted into egress data blocks with

7 sizes different from the ingress data blocks and egress headers, one egress

8 header associated with each egress data bock and conveying information about

9 the each egress data block, the computer data signal comprising:

10 program code that generates an ingress code check from data in an

11 ingress data block and from an ingress header associated with the ingress data

12 block;

13 program code that generates a egress code check from the ingress code

14 check and an egress header associated with an egress data block derived from

15 in the ingress data block; and

16 program code that generates the outgoing information by combining the

17 egress header with the associated egress data block and the egress code check.